

### **Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

1. (Withdrawn) A different materials bonded member, comprising:
  - a metallic member
  - a ceramic base having a bonding surface including one of an active metal layer and a metalized layer on a portion thereof, said one of said active metal layer and said metalized layer comprising a metal which is active with respect to a ceramic constituting said ceramic base;
  - a solder material comprising Au interposed between said ceramic base and said metallic member; and
  - a barrier layer interposed between said ceramic base and said metallic member, said barrier layer comprising a material which protects against or suppresses the diffusion of a metal constituting said metallic member into said solder material, wherein
  - said ceramic base and said metallic member are bonded to one another via said solder material which is disposed on said bonding surface of said ceramic base and is heated and melted to form a pre-coat layer adhering to said bonding surface, said metallic member is disposed on a surface of said pre-coat layer and a bonded part is formed by solidifying said pre-coat layer after said pre-coat layer is heated and melted at a temperature between 1070 and 1150°C to bond said ceramic base and said metallic member to one another.
2. (Withdrawn) A different materials bonded member, comprising:
  - a metallic member;
  - a ceramic base having a bonding surface;

a solder material comprising Au interposed between said ceramic base and said metallic member, and including a metal which is active to a ceramic constituting said ceramic base; and

a barrier layer interposed between said ceramic base and said metallic member, said barrier layer comprising a material which protects against or suppresses the diffusion of a metal constituting said metallic member into said solder material, wherein

said ceramic base and said metallic member are bonded to one another via said solder material which is disposed on said bonding surface and is heated and melted to form a pre-coat layer adhering to said bonding surface, said metallic member is disposed on a surface of said pre-coat layer and a bonded part is formed by solidifying said pre-coat layer after said pre-coat layer is heated and melted at a temperature between 1070 and 1150°C to bond said ceramic base and said metallic member to one another.

3. (Withdrawn) A different materials bonded member according to claim 1, wherein the barrier layer is formed by plating the metallic member.
4. (Withdrawn) A different materials bonded member according to claim 1, wherein said barrier layer is bonded to said metallic member beforehand via a solder material having a melting point that is higher than 1150°C.
5. (Withdrawn) A different materials bonded member according to claim 1, wherein a thickness of said pre-coat layer is at least 20  $\mu\text{m}$ .
6. (Withdrawn) A different materials bonded member, comprising:
  - a metallic member;
  - a ceramic base having a bonding surface;

one of an active metal layer and a metalized layer disposed on said bonding surface of said ceramic base, said one of said active metal layer and said metalized layer comprising a metal which is active to a ceramic constituting said ceramic base;

a solder material interposed between said metallic member and said ceramic base, and disposed on said one of said active metal layer and said metalized layer, said solder material comprising Au; and

a barrier layer interposed between said solder material and said metallic member, said barrier layer comprising a material which protects against or suppresses the diffusion of a metal component constituting said metallic member into said solder material, wherein

said ceramic base and said metallic member are bonded to one another via said solder material and a bonded part is formed by solidifying said solder material after said solder material is heated and melted at a temperature between 1070 and 1150°C to bond said ceramic base and said metallic member to one another.

7. (Withdrawn) A different materials bonded member according to claim 1, wherein the hardness of the bonded part is at most  $Hv_{0.1} 100$ .
8. (Withdrawn) A different materials bonded member according to claim 1, wherein the barrier layer comprises Cr.
9. (Withdrawn) A different materials bonded member according to claim 1, wherein the metallic member comprises at least one material selected from the group consisting of Ni, Co, Fe and Cr.
10. (Withdrawn) A different materials bonded member according to claim 1, wherein the bonded member includes a chamber for producing a semiconductor therein.

11. (Withdrawn) A different materials bonded member according to claim 10, wherein the ceramic base is a susceptor for disposing a semiconductor wafer on a surface thereon and the metallic member is a corrosion-resisting ring for furnishing the chamber for producing a semiconductor with the susceptor.

12. (Withdrawn) A different materials bonded member according to claim 10, wherein the bonded part is exposed to inert and oxidizing atmospheres outside of the semiconductor manufacturing chamber and is exposed to an atmosphere inside of the semiconductor manufacturing chamber having a pressure that is lower than the pressure of the atmosphere outside of the semiconductor manufacturing chamber.

13. (Withdrawn) A different materials bonded member according to claim 1, further comprising a conductive material including at least one of Mo and W or an alloy thereof embedded in the ceramic base with a portion of the surface of the conductive material being exposed from the ceramic base, and the bonded part is formed so as to cover the portion of the surface of the conductive material to bond the ceramic base and the metallic member.

14. (Withdrawn) A different materials bonded member according to claim 13, wherein the metallic member is a terminal feeding to the conductive material and the bonded part is exposed to an atmosphere outside of the semiconductor manufacturing chamber.

15. (Withdrawn) A different materials bonded member according to claim 1, wherein the bonded member comprises a susceptor for mounting a semiconductor wafer and can function as any one of a heater and an electrostatic chuck, and both a heater and an electrostatic chuck.

16. (Withdrawn) A different materials bonded member, comprising:

a metallic member comprising one of Cr and an alloy composed essentially of Cr;

a ceramic base having a bonding surface including one of an active metal layer and a metalized layer on a portion thereof, said one of said active metal layer and said metalized layer comprising a metal which is active with respect to a ceramic constituting said ceramic base; and

a solder material comprising Au interposed between said metallic member and said ceramic base, wherein

said ceramic base and said metallic member are bonded to one another via said solder material which is disposed on said bonding surface of said ceramic base and is heated and melted to form a pre-coat layer adhering to said bonding surface, said metallic member is disposed on a surface of said pre-coat layer and a bonded part is formed by solidifying said pre-coat layer after said pre-coat layer is heated and melted at a temperature between 1070 and 1150°C to bond the ceramic base and the metallic member to one another.

17. (Withdrawn) A different materials bonded member, comprising:

a metallic member comprising one of Cr and an alloy composed essentially of Cr;

a ceramic base having a bonding surface including one of an active metal layer and a metalized layer on a portion thereof, said one of said active metal layer and said metalized layer comprising a metal which is active with respect to a ceramic constituting said ceramic base; and

a solder material comprising Au interposed between said metallic member and said ceramic base, and including a metal which is active to a ceramic constituting said ceramic base, wherein

said ceramic base and said metallic member are bonded to one another via said solder material which is disposed on said bonding surface of said ceramic base and is

heated and melted to form a pre-coat layer adhering to said bonding surface, said metallic member is disposed on a surface of said pre-coat layer, and a bonded part is formed by solidifying said pre-coat layer after said pre-coat layer is heated and melted at a temperature between 1070 and 1150°C to bond the ceramic base and the metallic member to one another.

18. (Withdrawn) A method for producing a different materials bonded member comprising a ceramic base and a metallic member bonded to one another via a solder material comprising Au, the method comprising the steps of:

disposing the solder material on a bonding surface of the ceramic base including one of an active metal layer and metalized layer comprising a metal which is active to a ceramic constituting the ceramic base;

heating and melting the solder material to form a pre-coat layer adhering to the bonding surface of the ceramic base;

disposing the metallic member on a surface of the pre-coat layer, with a barrier layer interposed between the metallic member and the ceramic base, said barrier layer comprising a material which protects against or suppresses the diffusion of a metal constituting the metallic member into the solder material;

heating and melting the pre-coat layer at a temperature between 1070 and 1150°C.; and

forming a bonded part by solidifying the pre-coat layer to bond the ceramic base and the metallic member to one another.

19. (Withdrawn) A method for producing a different materials bonded member comprising a ceramic base and a metallic member bonded to one another via a solder material comprising Au, the method comprising the steps of:

disposing the solder material on a bonding surface of the ceramic base, said solder material comprises a metal which is active to a ceramic comprising the ceramic base;

heating and melting the solder material to form a pre-coat layer adhering to the bonding surface of the ceramic base;

disposing the metallic member on a surface of the pre-coat layer, with a barrier layer interposed between the metallic member and the ceramic base, the barrier layer comprising a material which protects against or suppresses the diffusion of a metal comprising the metallic member into the solder material;

heating and melting the pre-coat layer at a temperature between 1070 and 1150°C.; and

forming a bonded part by solidifying the pre-coat layer to bond the ceramic base and the metallic member to one another.

20. (Withdrawn) The method according to claim 19, wherein the solder material is a mixture of Au powder and a powder of said metal which is active to the ceramic comprising the ceramic base.

21. (Withdrawn) The method according to claim 18, wherein the barrier layer is formed by plating the metallic member.

22. (Withdrawn) The method according to claim 18, wherein the barrier layer is bonded to the metallic member beforehand with a solder material having a melting point that is higher than 1150°C.

23. (Withdrawn) The method according to claim 18, wherein the thickness of the pre-coat layer is at least 20  $\mu\text{m}$ .

24. (Currently Amended) A method for producing a different materials bonded member comprising a ceramic base and a metallic member bonded to one another via a solder material comprising Au, the method comprising the steps of:

disposing in turn on a bonding surface of the ceramic base (i) one of an active metal layer and a metalized layer comprising a metal which is active to a ceramic constituting the ceramic base, (ii) the solder material, (iii) a barrier layer comprising a material which has a higher melting point than the solder and which protects against or suppresses the diffusion of a metal component constituting the metallic member into the solder material as an inner layer, and (iv) the metallic member;

heating and melting the solder material at a temperature between 1070 and 1150°C.; and

forming a bonded part by solidifying the solder material to bond the ceramic base and the metallic member to one another.

25. (Withdrawn) The method according to claim 18, wherein the hardness of the bonded part is at most  $Hv_{0.1}100$ .

26. (Withdrawn) The method according to claim 18, wherein the barrier layer comprises Cr.

27. (Withdrawn) The method according to claim 18, further comprising a conductive material including one of Mo and W or an alloy thereof embedded in the ceramic base with a portion of the surface of the conductive material being exposed from the ceramic base, and the bonded part is formed so as to cover the portion of the surface of the conductive material to bond the ceramic base and the metallic member.

28. (Withdrawn) A method for producing a different materials bonded member comprising a ceramic base and a metallic member bonded to one another via a solder material comprising Au, the method comprising the steps of:

disposing the solder material on a bonding surface of the ceramic base including one of an active metal layer and metalized layer comprising a metal which is active to a ceramic constituting the ceramic base;



heating and melting the solder material to form a pre-coat layer adhering to the bonding surface;

disposing the metallic member comprising one of Cr and an alloy composed essentially of Cr on a surface of the pre-coat layer;

heating and melting the pre-coat layer at a temperature between 1070 and 1150°C.; and

forming a bonded part by solidifying the pre-coat layer to bond the ceramic base and the metallic member to one another.

29. (Withdrawn) A method for producing a different materials bonded member comprising a ceramic base and a metallic member bonded to one another via a solder material comprising Au, the method comprising the steps of:

disposing the solder material on a bonding surface of the ceramic base, the solder material comprises a metal which is active to a ceramic constituting the ceramic base;

heating and melting the solder material to form a pre-coat layer adhering to the bonding surface;

disposing the metallic member comprising one of Cr and an alloy composed essentially of Cr on a surface of the pre-coat layer;

heating and melting the pre-coat layer at a temperature between 1070 and 1150°C.; and

forming a bonded part by solidifying the pre-coat layer to bond the ceramic base and the metallic member to one another.

30. (Withdrawn) The method according to claim 29, wherein the solder material is a mixture of Au powder and a powder of said metal which is active to a ceramic constituting the ceramic base.

31. (Original) A method for producing a different materials bonded member comprising a ceramic base and a metallic member bonded to one another via a solder material comprising Au, the method comprising the steps of:

disposing in turn on a bonding surface of the ceramic base (i) one of an active metal layer and a metalized layer comprising a metal which is active to a ceramic constituting the ceramic base, (ii) the solder material, and (iii) the metallic member comprising one of Cr and an alloy composed essentially of Cr;

heating and melting the solder material at a temperature between 1070 and 1150°C; and

forming a bonded part by solidifying the solder material to bond the ceramic base and the metallic member to one another.

32. (Original) A method for producing a different materials bonded member comprising a ceramic base and a metallic member bonded to one another via a solder material comprising Au, the method comprising the steps of:

disposing in turn on a bonding surface of the ceramic base (i) one of an active metal layer and a metalized layer comprising a metal which is active to a ceramic constituting the ceramic base, (ii) the solder material comprising a metal which is active to the ceramic constituting the ceramic base, and (iii) the metallic member comprising one of Cr and an alloy composed essentially of Cr;

heating and melting the solder material at a temperature between 1070 and 1150°C.; and

forming a bonded part by solidifying the solder material to bond the ceramic base and the metallic member to one another.

33. (Original) The method according to claim 32, wherein the solder material is a mixture of Au powder and a powder of said metal which is active to the ceramic constituting the ceramic base.

## **REMARKS/ARGUMENTS**

Claims 1-33 are pending herein. Claim 24 has been amended as supported by paragraph [0049] of the present application, for example.

Claims 1-23 and 25-30 stand withdrawn from consideration. The Restriction Requirement should be reconsidered and withdrawn at least with respect to method claims 18-23 and 25-30, because those claims are sufficiently related to the elected method claims that search and examination of all of these claims would not impose a burden on the U.S. PTO.

1. Claims 24 and 31-33 were rejected under the judicially created doctrine of obviousness-type double patenting rejection over claims 27, 30, 31, 35 and 36 of U.S. Patent No. 6,918,530. This rejection is respectfully traversed.

First, to alleviate confusion, the Examiner is requested to note that claims 27, 30, 31, 35 and 36 as listed in the Office Action are prosecution claim numbers. These claims correspond directly to claims 1, 4, 5, 9 and 10 of the '530 patent, respectively.

Independent claim 24 has been amended to recite that the barrier layer comprises a material which has a higher melting point than the solder and which protects against or suppresses the diffusion of a metal component constituting the metallic member into the solder material as an inner layer. This limitation distinguishes the pending claims from the claims of the '530 patent, as there is no disclosure or suggestion in the claims of the '530 patent of this feature.

Independent claim 31 recites a method for producing a different metals bonded member comprising at least the step of disposing in turn on a bonded surface of the ceramic base (i) one of an active metal layer and a metallized layer comprising a metal which is active to a ceramic constituting the ceramic base, (ii) the solder material, and (iii) the metallic member comprising one of Cr and an alloy composed essentially of Cr. The step of disposing a metallic member comprising one of Cr and an alloy composed essentially of Cr directly onto a solder material distinguishes the pending

claims from the claims of the '530 patent, as there is no disclosure or suggestion in the claims of the '530 patent of this feature.

Independent claim 32 recites a method for producing a different materials bonded member comprising at least the step of disposing in turn on a bonding surface of the ceramic base (i) one of an active metal layer and a metallized layer comprising a metal which is active to a ceramic constituting the ceramic base, (ii) the solder material comprising a metal which is active to the ceramic constituting the ceramic base, and (iii) the metallic member comprising one of Cr and an alloy composed essentially of Cr. The step of disposing a metallic member comprising one of Cr and an alloy composed essentially of Cr directly onto a solder material comprising a metal, which is active to the ceramic constituting the ceramic base, distinguishes the pending claims from the claims of the '530 patent, as there is no disclosure or suggestion in the claims of the '530 patent of this feature.

For at least the reasons stated above, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 24 and 31-33 under the judicially created doctrine of obviousness-type double patenting over claims 1, 4, 5, 9 and 10 of the '530 patent.

2. Claim 24 was rejected under §102(b) over Boecker. To the extent that this rejection may be applied against the amended claim, it is respectfully traversed.

Claim 24 recites a method for producing a different materials bonded member comprising a ceramic base and a metallic member bonded to one another via a solder material comprising Au. The method comprises the step of disposing in turn on a bonding surface of the ceramic base (i) one of an active metal layer and a metallized layer comprising a metal which is active to a ceramic constituting the ceramic base, (ii) the solder material, (iii) a barrier layer comprising a material which has a higher melting point than the solder and which protects against or suppresses the diffusion of a metal component constituting the metallic member into the solder material as an inner layer, and (iv) the metallic member. The method further comprises the steps of heating and melting the solder material at a temperature between 1070 and 1150°C,

and forming a bonded part by solidifying the solder material to bond the ceramic base and the metallic member to one another.

Boecker discloses, in Fig. 1, the attachment of a metallic member to a ceramic base using an adherent metal layer, a compliant layer, an optional antioxidation layer and a braze. Boecker discloses, in column 7, lines 65-67 that the adherent metal layer (alleged by the Examiner to be the claimed active metal layer) is made of Ni, Au, Ag or Cu that is electrolessly plated onto the ceramic substrate. Applicants respectfully submit that Ni, Au, Ag and Cu are not active metals for ceramic bases such as SiC, SiN, AlN, etc. Active metals react with a ceramic base to form a subsequent compound. For example, active metals such as Ti and Zr react with a SiC ceramic base to form TiC and ZrC. However, the affinity of Ni, Au, Ag and Cu to N and C is low and thus they are not active with N and C. Therefore, Boecker fails to disclose at least the step of disposing on a bonding surface of the ceramic base one of an active metal layer and a metallized layer comprising a metal which is active to a ceramic constituting the ceramic base, as recited in claim 24. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

3. Claims 24 and 31-33 were rejected under §102(e) over Shinkai. To the extent that this rejection may be applied against the amended claims, it is respectfully traversed.

Shinkai discloses, in Figs. 2a-c, the placement of an insertion layer 10 between the precoat layer 6 (made up of an active metal layer 4 and a solder material 5) and a metallic member 7. Shinkai discloses, in column 15, lines 10-17, that the insertion layer comprises “pure metal which may form an alloy (low-melting-point Au alloy) having a lower melting point than Au with Au or an alloy (low-melting-point Au alloy) of the pure metal and Au. Furthermore, Shinkai discloses, in column 15, lines 52-65, that the “base material and the metallic member can be bonded together only by keeping the insertion metal layer and the precoat layer at the same temperature.” Clearly, the insertion layer 10 of Shinkai is not in any way similar in form or function to the barrier layer of the present invention having a higher melting point than the

solder containing Au. Therefore, Shinkai fails to disclose the inclusion of a barrier layer comprising a material which has a higher melting point than the solder and which protects against or suppresses the diffusion of a metal component constituting the metallic member into the solder material as an inner layer, as recited in claim 24.

Claim 31 recites a method for producing a different materials bonded member comprising a ceramic base and a metallic member bonded to one another via a solder material comprising Au. The method comprises the step of disposing in turn on a bonding surface of the ceramic base (i) one of an active metal layer and a metallized layer comprising a metal which is active to a ceramic constituting the ceramic base, (ii) the solder material, and (iii) the metallic member comprising one of Cr and an alloy composed essentially of Cr.

As discussed above, Shinkai discloses the inclusion of an insertion metal layer 10 between the precoat layer 6 (made of the active metal layer 4 and the solder material 5) and the metallic member 7. Shinkai discloses, in column 8, lines 56-59, that the insertion metal layer 10 must be formed densely so that the precoat layer 6 and the metallic member 7 substantially do not make contact with each other. Shinkai discloses, in column 15, lines 52-65, that the “base material and the metallic member can be bonded together only by keeping the insertion metal layer and the precoat layer at the same temperature.” Accordingly, Shinkai does not disclose placing the metallic member 10 directly on the precoat layer 6 containing the active metal layer 4 and the solder material 5. Therefore, Shinkai fails to disclose a method comprising at least the step of disposing in turn on a bonding surface of the ceramic base (i) one of an active metal layer and a metallized layer comprising a metal which is active to a ceramic constituting the ceramic base, (ii) the solder material, and (iii) the metallic member comprising one of Cr and an alloy composed essentially of Cr, as recited in claim 31.

Claim 32 discloses a method for producing a different materials bonded member comprising a ceramic base and a metallic member bonded to one another via a solder material comprising Au. The method comprises the step of disposing in turn on a bonding surface of the ceramic base (i) one of an active metal layer and a metallized

layer comprising a metal which is active to a ceramic constituting the ceramic base, (ii) the solder material comprising a metal which is active to the ceramic constituting the ceramic base, and (iii) the metallic member comprising one of Cr and an alloy composed essentially of Cr.

As discussed in further detail above, Shinkai discloses the inclusion of an insertion metal layer 10 between the precoat layer 6 (made of the active metal layer 4 and the solder metal 5) and the metallic member 7. Shinkai discloses, in column 8, lines 56-59, that the insertion metal layer 10 must be formed densely so that the precoat layer 6 and the metallic member 7 substantially do not make contact with each other. Shinkai discloses, in column 15, lines 52-65, that the “base material and the metallic member can be bonded together only by keeping the insertion metal layer and the precoat layer at the same temperature.” Accordingly, Shinkai does not disclose placing the metallic member 10 directly on the precoat layer 6 containing the active metal layer 4 and the solder material 5. Therefore, Shinkai fails to disclose at the least the step of disposing in turn on a bonded surface of the ceramic base (i) one of an active metal layer and a metallized layer comprising a metal which is active to a ceramic constituting the ceramic base, (ii) the solder material comprising a metal which is active to the ceramic constituting the ceramic base, and (iii) the metallic member comprising one of Cr and an alloy composed essentially of Cr, as recited in claim 32. Since claim 33 depends directly from claim 32, claim 33 is also believed to be allowable over the applied art.

Applicants respectfully submit that the arguments submitted above distinguish claims 24 and 31-33 from Shinkai. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

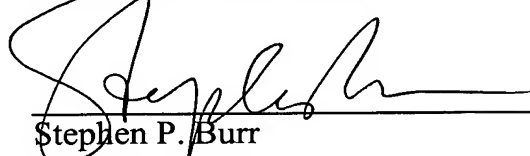
For at least the foregoing reasons, Applicants respectfully submit that all pending claims herein define patentable subject matter over the art of record. Accordingly, the Examiner is requested to issue a Notice of Allowance for this application in due course.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

March 9, 2006  
Date

Respectfully submitted,

  
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